

CLAIMS

- 1.- A miniature broadband microstrip patch antenna comprising at least two conducting parallel surfaces and a conducting ground plane or counter-poise, the conducting first surface acting as an active element being placed substantially parallel on top said ground plane and including a feeding point, the second surface acting as a parasitic element placed above of said first surface, said patch antenna characterized in that at least one of the said first or second conducting surfaces consists of a planar ring comprising an inner and outer perimeter wherein the shape of at least one of said perimeters is a space-filling curve, said space-filling curve being composed by at least ten segments, said segments connected with each adjacent segment, said adjacent segments forming an angle with their neighbours, no pair of adjacent segments defining a larger straight segment, wherein said space-filling curve never intersects with itself at any point except the initial and final points, and wherein said segments must be shorter than a tenth of the free-space operating wavelength to keep the antenna size reduced.
- 2.- A miniature broadband microstrip patch antenna according to claim 1, wherein at least one of said surfaces is displaced laterally such that the two axes that orthogonally cross the centre of both surfaces do not overlap, to control this way both the impedance bandwidth and the beamwidth of the radiation pattern.
- 3.- A miniature broadband microstrip patch antenna according to claims 1 or 2 wherein a dielectric, magnetic or magneto-dielectric material is placed below or above at least one of said first or second surfaces.
- 4.- A miniature broadband microstrip patch antenna according to claims 1, 2 or 3 wherein the resonant frequencies of the first and second surfaces are substantially similar with a difference less than a 20%.

5.- A miniature broadband microstrip patch antenna according to any of the previous claims wherein the center of said inner perimeter does not match the position of the center of said outer perimeter and the antenna features an input impedance above 5 Ohms.

5

6.- A miniature broadband microstrip patch antenna according to any of the previous claims wherein the antenna is operated at a frequency mode of larger order than the fundamental one to feature a high gain radiation pattern.

10

15

20

25